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TITLE: HCMM/SOIL MOISTURE EXPERIMENT

INVESTIGATION NUMBER: HCM - 054

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1. INTRODUCTION

During 1980, significant amounts of HCMM images were received and catalogued. The digitization of airborne thermal IR imagery and apparent temperatures retraction for the four 1978 and 1979 missions were completed. Airborne remotely sensed, ground, and meteorological data were compiled and are now ready for analysis. Available HCMM images were reviewed to select optimum day/night pairs so that digital data may be ordered for a quantitative analysis.

2. TECHNIQUES

The same techniques as described in the previous Progress Report (Cihlar, 1979) were used.

3. ACCOMPLISHMENTS

No detailed HCMM image analysis was undertaken to date.

4. RESULTS

Table 1 lists the best HCMM images which have been made available to date for the south Alberta site. Although most images show significant amounts of clouds, the primary test area is either cloud-free or partly covered on the scenes listed. Images which show no atmospheric effects have been designated as candidates for digital analysis. Others will be used in visual or machine-assisted analysis of the analogue data. The selection of images to be ordered as digital data will be made in the near future.

TABLE 1. HCMM IMAGERY OVER SOUTH ALBERTA FOR SUMMER MONTHS OF 1978.

Pair Number	Day Imagery				Night Imagery				Comments
	Date 1978	Lat.	Long.	Cloud Cover	Date	Lat.	Long.	Cloud Cover	
1.	2 June	49	108	35	-	-	-	-	Day only,for visual anal.only
2.	4 June	47	117	5	4 June 78	47	116	5	Good atmospheric conditions
3.	4 June	47	117	-	4 June 78	53	113	10	Good atmospheric conditions
4.	7 June	49	107	40	8 June 78	53	107	40	Marginal,for visual anal.only
5.	8 June	52	113	60	8 June 78	47	110	20	For visual analysis only
6.	13 June	53	112	60	-	-	-	-	Day only,for visual anal.only
7.	14 June	46	113	50	14 June 78	52	111	30	Suitable for digital analysis
	14 June	52	116	70	-	-	-	-	Adjacent day image
8.	13 June	47	109	40	14 June 78	52	111	30	Suitable for digital analysis
9.	20 June	50	118	35	20 June 78	51	114	40	Suitable for digital analysis
10.	28 June	52	107	20	-	-	-	-	Day only,for visual anal.only
11.	29 June	53	112	40	-	-	-	-	Day only,for visual anal.only
12.	29 June	47	109	50	30 June 78	47	113	15	Suitable for digital analysis
13.	5 July	52	114	30	5 July 78	52	110	35	For visual analysis only
14.	9 July	51	108	60	-	-	-	-	Day only,for visual anal.only
15.	10 July	52	113	80	11 July 78	52	112	65	For visual analysis only
16.	16 July	48	114	50	16 July 78	47	113	35	Suitable for digital analysis
17.	15 July	48	110	10	16 July 78	47	113	35	Suitable for digital analysis
18.	15 July	48	110	10	16 July 78	53	111	20	Suitable for digital analysis
19.	16 July	48	114	50	16 July 78	53	111	20	Suitable for digital analysis
20.	22 July	51	118	25	22 July 78	53	114	5	Marginal for digital
21.	22 July	51	118	25	22 July 78	47	116	5	analysis, mainly
22.	21 July	46	112	30	21 July 78	47	111	15	for visual analysis
23.	21 July	46	112	30	22 July 78	47	116	5	Marginal...for visual anal.
24.	21 July	52	114	20	22 July 78	47	116	5	Marginal...for visual anal.
25.	21 July	52	114	20	22 July 78	53	114	-	Marginal...for visual anal.
26.	26 July	49	112	25	-	-	-	-	Day only,for visual anal.only
27.	27 July	47	115	25	-	-	-	-	Day only,for visual anal.only
28.	7 Aug.	47	117	5	7 Aug. 79	50	114	50	Suitable for digital analysis
29.	10 Aug.	50	107	10	-	-	-	-	Day only,for visual anal.only
30.	11 Aug.	50	111	50	-	-	-	-	Day only,for visual anal.only
31.	21 Aug.	53	109	60	-	-	-	-	Day only,for visual anal.only
32.	21 Aug.	47	107	15	-	-	-	-	Day only,for visual anal.only
33.	26 Aug.	51	107	25	27 Aug. 79	50	108	15	Marginal, for visual anal.only

5. PUBLICATIONS

CIHLAR, J. 1980. Soil Water and Plant Canopy Effects on Remotely Measured Surface Temperatures. To be published in the International Journal of Remote Sensing.

CIHLAR, J. 1979. HCMM/Soil Moisture Experiment. Progress Report submitted to NASA. 10p.

6. PROBLEMS

The major problem continued to be the lack of cloud-free, high quality HCMM images over the experimental area. Although HCMM data are still being delivered, schedule considerations necessitate that image selection for detailed analysis be made in the near future. This means that only portions of HCMM images will be analyzed. Emphasis will be put on visual analysis and a comparison of temporal trends.

Problems were also experienced with the digitized thermal scanner data. As a result, the completion of apparent temperatures extraction was delayed. Some scanner data exhibited noise caused by the system's instability during the flight.

As a result of delays encountered in analogue and digital data delivery, it will be necessary to extend the deadline for completion of the project. The length of additional time required can be determined out after all the necessary digital satellite data are received.

7. DATA QUALITY AND DELIVERY

Image delivery has been very good during 1980. The quality was good for the visible band but many poor quality IR images have been received, some with no useful data. This appeared to be due to problems with the IR channel of the satellite sensor.

8. RECOMMENDATIONS

None.